

# Model 3088/1 **RocketLink-G G.SHDSL NTU**

## Getting Started Guide



### Important

This is a Class A device and is intended for use in a light industrial environment. It is not intended nor approved for use in an industrial or residential environment.

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This warranty is limited to defects in workmanship or materials, and does not cover customer damage, abuse or unauthorized modification. If this product fails or does not perform as warranted, your sole recourse shall be repair or replacement as described above. Under no condition shall Patton Electronics be liable for any damages incurred by the use of this product. These damages include, but are not limited to, the following: lost profits, lost savings and incidental or consequential damages arising from the use of or inability to use this product. Patton Electronics specifically disclaims all other warranties, expressed or implied, and the installation or use of this product shall be deemed an acceptance of these terms by the user.

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# About this guide

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This guide describes installing and operating the Patton Electronics Model 3088/I G.SHDSL RocketLink-G™ NTU.

## Audience

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This guide is intended for the following users:

- Operators
- Installers
- Maintenance technicians

## Structure

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This guide contains the following chapters and appendices:

- [Chapter 1](#) on page 14 provides information about NTU features and capabilities
- [Chapter 2](#) on page 16 contains an overview describing NTU operation and applications
- [Chapter 3](#) on page 22 provides hardware installation procedures
- [Chapter 4](#) on page 28 provides quick-start procedures for configuring the RocketLink-G NTU
- [Chapter 5](#) on page 32 describes how to install and operate the RocketLink-G NTU
- [Chapter 6](#) on page 36 describes how to configure the RocketLink-G NTU, save the configuration, reset the NTU to the factory default condition, and upgrade the system software
- [Chapter 7](#) on page 41 describes the system tools that can be used to diagnose problems with the NTU
- [Chapter 8](#) on page 43 contains information on contacting Patton technical support for assistance
- [Appendix A](#) on page 46 contains compliance information for the RocketLink-G NTU
- [Appendix B](#) on page 49 contains specifications for the NTU
- [Appendix C](#) on page 54 provides cable recommendations
- [Appendix D](#) on page 56 describes the NTU's ports and pin-outs
- [Appendix E](#) on page 58 lists the factory configuration settings for RocketLink-G NTU
- [Appendix F](#) on page 60 provides license information that describes acceptable usage of the software provided with the RocketLink-G NTU

For best results, read the contents of this guide *before* you install the NTU.

## Precautions

Notes, cautions, and warnings, which have the following meanings, are used throughout this guide to help you become aware of potential problems. **Warnings** are intended to prevent safety hazards that could result in personal injury. **Cautions** are intended to prevent situations that could result in property damage or impaired functioning.

**Note** A note presents additional information or interesting sidelights.



The alert symbol and IMPORTANT heading calls attention to important information.



The alert symbol and CAUTION heading indicate a potential hazard. Strictly follow the instructions to avoid property damage.



The shock hazard symbol and CAUTION heading indicate a potential electric shock hazard. Strictly follow the instructions to avoid property damage caused by electric shock.



The alert symbol and WARNING heading indicate a potential safety hazard. Strictly follow the warning instructions to avoid personal injury.



The shock hazard symbol and WARNING heading indicate a potential electric shock hazard. Strictly follow the warning instructions to avoid injury caused by electric shock.

## Safety when working with electricity



- This device contains no user serviceable parts. The equipment shall be returned to Patton Electronics for repairs, or repaired by qualified service personnel.
- **AC Powered Units:** The external power adaptor shall be a listed Limited Power Source. Ensure that the power cable used meets all applicable standards for the country in which it is to be installed, and that it is connected to a wall outlet which has earth ground. The mains outlet that is utilized to power the device shall be within 10 feet (3 meters) of the device, shall be easily accessible, and protected by a circuit breaker.
- **DC Powered Units:** The interconnecting cables shall be rated for proper voltage, current, anticipated temperature, flammability, and mechanical serviceability.
- Hazardous network voltages are present in WAN ports, regardless of whether power to the unit is ON or OFF. To avoid electric shock, use caution when near WAN ports. When detaching the cables, detach the end away from the device first.
- Do not work on the system or connect or disconnect cables during periods of lightning activity.



In accordance with the requirements of council directive 2002/96/EC on Waste of Electrical and Electronic Equipment (WEEE), ensure that at end-of-life you separate this product from other waste and scrap and deliver to the WEEE collection system in your country for recycling.

## General observations

- Clean the case with a soft slightly moist anti-static cloth
- Place the unit on a flat surface and ensure free air circulation
- Avoid exposing the unit to direct sunlight and other heat sources
- Protect the unit from moisture, vapors, and corrosive liquids


## Typographical conventions used in this document

This section describes the typographical conventions and terms used in this guide.

### General conventions

The procedures described in this manual use the following text conventions:

Table 1. General conventions

Convention	Meaning
Garamond blue type	Indicates a cross-reference hyperlink that points to a figure, graphic, table, or section heading. Clicking on the hyperlink jumps you to the reference. When you have finished reviewing the reference, click on the <b>Go to Previous View</b> button  in the Adobe® Acrobat® Reader toolbar to return to your starting point.
<b>Futura bold type</b>	Commands and keywords are in <b>boldface</b> font.
<b><i>Futura bold-italic type</i></b>	Parts of commands, which are related to elements already named by the user, are in <b>boldface italic</b> font.
<i>Italicized Futura type</i>	Variables for which you supply values are in <i>italic</i> font
Futura type	Indicates the names of fields or windows.
Garamond bold type	Indicates the names of command buttons that execute an action.

# Chapter 1 **General information**

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## RocketLink-G 3088/I overview

The Patton Electronics Model 3088/I G.SHDSL RocketLink provides high speed 2-wire connectivity to ISPs, PTTs, and enterprise environments using Symmetrical High-data-rate Digital Subscriber Line (G.SHDSL) technology.

The Model 3088/I provides a 10/100BaseT Ethernet interface on a shielded RJ-45 jack, the DSL on an RJ-11 jack, and the RS-232 console port on an RJ-45 jack.

As a symmetric, full-duplex NTU, the RocketLink DSL offers equal data rates in both directions over a single twisted pair using TC-PAM modulation. Line connection is made through the RJ-11 jack. Standard versions of Model 3088/I are powered by a UI (universal 100–240 VAC) supply.



Figure 1. RocketLink-G 3088/I

## Features

- Symmetrical high data-rate DSL (G.SHDSL)
- Data rates up to 4.6Mbps in 64-kbps intervals
- 10Base-T/100Base-TX Ethernet interface
- RS-232 console port for management and configuration
- Built-in testing and diagnostics
- RocketLink Plug 'n' Play for easy installations
- Interoperable with other Patton G.SHDSL modems
- Configurable as remote (CP) units
- Configurable as central (CO) units to operate back-to-back
- Front-panel status indicators
- CE marked

## Chapter 2 **Initial configuration**

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## Introduction

The Model 3088/I (see [figure 2](#)) has two configuration modes: RS-232 console and web page GUI software.



Figure 2. Model 3088/I

The RS-232 console is used for the initial configuration of the IP address and mask. Subsequently the easiest method is to use a standard web browser to complete the configuration.

The 3088/I is Plug 'n' Play with the Model 3096RC G.SHDSL concentrator card or compatible G.SHDSL card.

## Power up the NTU

Your NTU comes with an external AC adaptor with detachable power cord. (Also refer to “[Power-up](#)” on page 33.)



**Ensure that the power cable used with the external power adapter meets all applicable standards for the country in which it is to be installed, and that it is connected to a wall outlet which has earth ground.**

### AC power-up

1. Connect female plug of the AC power cord to the AC adaptor provided.
2. Connect the barrel-type connector of the AC adaptor to the barrel-type power jack on the RocketLink-G NTU.
3. Insert the male plug of the AC power cord into an AC power outlet (100–240 VAC).

### DC power-up

The 36-60 VDC DC to DC adapter is supplied with the DC version of the Model 3088/I. The black and red leads plug into a DC source (nominal 48VDC) and the barrel power connector plugs into the barrel power supply jack on the 3088/I. (See [figure 3](#)).



Figure 3. DC Power Supply



There are no user-servicable parts in the power supply section of the Model 3088/1. Fuse replacement should only be performed by qualified service personnel. See Chapter 8, “[Contacting Patton for assistance](#)” on page 64.

### Power-up indication

The *Power* and *100M Ethernet* LEDs are lit while the RocketLink-G is powering up.

### Configure the IP address

The RocketLink-G NTU is shipped with a factory-configured IP address assigned to the *Ethernet* LAN port (green outline). The address is *192.168.200.10/24*. In most cases, you must change the address to be on the same subnet as your PC, as described in the procedures below. If you are not sure which IP address to use for your installation, contact your network administrator.

### Connect a PC and log in

Using the included combination RS-232/Ethernet cable and DB9-RJ45 adapter, connect a PC’s serial port to the RocketLink-G’s *Console* port (red outline) (see [figure 4](#)).



The interconnecting cables shall be acceptable for external use and shall be rated for the proper application with respect to voltage, current, anticipated temperature, flammability, and mechanical serviceability.

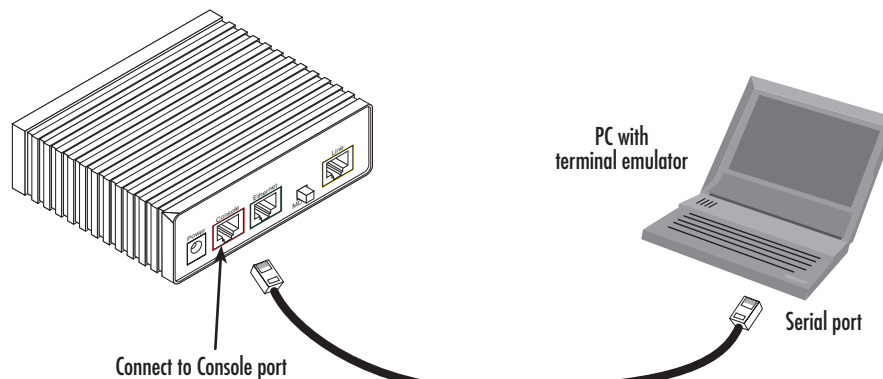


Figure 4. Connecting RocketLink-G NTU to the PC’s serial port

1. Start a HyperTerminal session on the PC using the settings:  
9600 bps, 8 data bits, no parity, 1 stop bit, no flow control
2. Log in to the RocketLink-G NTU using the factory-default login (*superuser*) and password (*superuser*):

```
Login: superuser
Password: *****
Login successful
```

### Modify the IP address

1. Display current IP interface settings for the RocketLink-G *Ethernet* LAN port.

```
ip list interfaces <enter>

IP Interfaces:
ID | Name | IP Address | DHCP | Transport
--|-----|-----|-----|-----
1 | ip1 | 192.168.200.10 | disabled | <BRIDGE>
```

2. Modify the IP address for the LAN port according to your network requirements.

```
ip set interface ip1 ipaddress 10.10.4.10 255.255.255.0
```

**Note** The above IP address (10.10.4.10/24) is only an example. You must choose an IP address on the same subnet as your PC.

3. Verify the new address is correct and save it in system boot memory.

```
→ ip list interfaces <enter>
→ system config save <enter>
```

### Connect to the local IP network

Now you can connect the RocketLink-G NTU to your local IP network and complete the remaining configuration from your PC using a standard web browser.

Connect the RocketLink-G NTU's *Ethernet* port (green) to the same Ethernet segment as your PC (see [figure 5](#)). The front-panel *Ethernet Link* LED should turn on. If it does not, press the rear-panel MDI-X switch so that the *Ethernet Link* LED illuminates.

You can check the connection with the ping command. For example shown in [figure 5](#), you would ping 10.10.4.10 from a PC on the IP network.

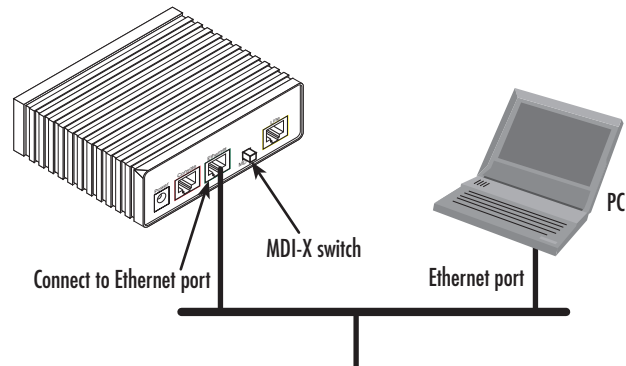


Figure 5. Connecting the RocketLink-G to the local IP network (Model 3088/I shown)

### Log onto the web management interface

You will now access the web management graphical user interface (GUI) to configure the RocketLink-G using a standard web browser (such as Netscape Browser, Mozilla Firefox, or Internet Explorer).

1. At your PC, open a web browser and enter the IP address you assigned to the RocketLink-G's Ethernet LAN port in step 2 of section "Modify the IP address" on page 19. (In this example, 10.10.4.10.) (see figure 6)

The screenshot shows the web management interface for the RocketLink-G. On the left is a vertical red navigation menu with the text '3088/I CONFIGURATION MENU'. The main content area has a header: 'Patton Electronics Company 3088/I G.SHDSL NTU Software Revision 2.6.1 Oct 26 2005'. Below this is a section titled 'Status of 3088/I G.SHDSL NTU' containing a table with the following data:

DSL Link Status:	Normal Operation
DSL Link Rate Timeslot:	32
Local IP Address:	10.10.19.3
PP CPU Usage:	1%
NP CPU Usage:	0%
Up-Time:	4 days, 22 hours
Current Time:	Mon, 05 Jan 2004 - 22:25:50

At the bottom of the page, there is a copyright notice: 'Copyright (c) 2005 Patton Electronics Co. Terms and conditions'.

Figure 6. RocketLink-G web management home page

2. Log in to the web management home page using the username *superuser* and the password *superuser*.

### Connect the G.SHDSL port

3. Obtain single-twisted-pair cable with an RJ-11 plug connector at each end.
4. Plug one end of the cable into the (yellow) RJ-11 socket (labelled *Line*) on the RocketLink-G NTU. (See figure 7.)
5. Plug the other end of the cable into the RJ-11 wall socket that provides your G.SHDSL service.
6. Go to *G.SHDSL > Configuration* to configure the DSL port parameters.

**Note** If two RocketLink-G NTUs are connected back-to-back, one must be configured as **Remote**, the other as **Central**.

7. The *WAN Link* LED will flash while in the process of establishing a link. The LED will be on constantly once a valid DSL connection is established.

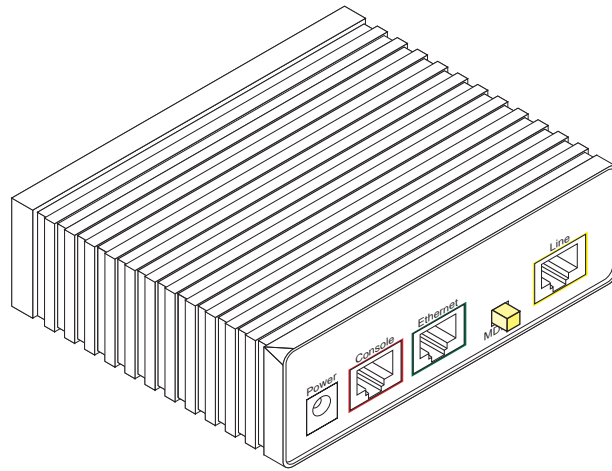


Figure 7. Rear view of 3088/I showing DSL RJ-11 jack

## Chapter 3 **G.SHDSL config and status**

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## DSL configuration

By going to the *Configuration* hyperlink in the *Configuration Menu*, you can configure the DSL link to specific parameters if the 3088/I is not used in the Plug 'n' Play mode. They are listed as follows.

**Note** After changing the parameters in the *DSL Configuration* section of the web page, they take immediate effect upon clicking the **Configure** button.

The screenshot shows the 'DSL Configuration' web page. On the left is a vertical red navigation menu labeled '3088/I CONFIGURATION MENU' with links for Home, System Management, Ethernet, Configuration (selected), and Status. The main content area is titled 'Configuration:' and contains a 'DSL Configuration' form with the following fields:

Circuit ID	<input type="text"/>
Intended DSL Data Rate	2048K
Actual DSL Data Rate (kbps)	2048
Annex Type	Annex B
Device Type	Remote
Line Probe	Disable
Action	Start

At the bottom of the form is a 'Configure' button.

Figure 8. DSL Configuration

### DSL Parameters

- **Circuit ID:** The circuit ID communicated to other units via EOC. EOC (embedded operations channel) is an out-of-band channel specified in the G.991.2 standard for SHDSL. We use standard EOC messages for our remote loopback. The 3088/I also supports proprietary EOC messages that allow a 3096RC to configure it.
- **Intended DSL Data Rate:** This selects the desired DSL data rate.
- **Actual DSL Data Rate (kbps):** The actual current data rate that the DSL link is operating, minus the DSL overhead (8 kbps).
- **Annex Type:** Either G.991.2 Annex A or Annex B.
- **Device Type:** The two options are *Remote* (default) or *Central*. When configuring two units back-to-back, one must be remote, the other central.
- **Line Probe:** The line probe may be disabled (default) or enabled for rate adaptive applications.
- **Action:** To initiate the DSL link, select *Start* and click on the **Configure** button. To take the DSL link down, select *Deactivate* and click on the **Configure** button.

## DSL Error Monitor Configuration

The DSL Error Monitor provides various statistics for the DSL line. The monitor parameters are configured here. The error counters are also cleared from this menu.

DSL Error Monitor Configuration	
Clear Error Counters	Do not Clear
Error Monitor Max Interval Errors	3
Error Monitor Interval Time(sec)	1
Error Monitor Interval Count	3
Error Monitor Total Intervals	10
Error Monitor Start Up Delay	5
<input type="button" value="Configure"/>	

Figure 9. DSL Error Monitor Configuration

The following shows the relationship of the DSL Error Monitor parameters:

Startup Delay	Interval #1	Interval #2	...	Interval #Total Intervals
Start Up Delay	Interval Time (sec)	Interval Time (sec)	Interval Time (sec)	Interval Time (sec)

The DSL error monitor inspects intervals to see if they have met the error threshold (Max Interval Errors). If the error monitor finds a certain number (Interval Count) of intervals that meet or exceed the error threshold, it will restart the DSL link. The error monitor will wait (Start Up Delay) seconds after the DSL link comes up before it begins monitoring errors. After the startup delay, it will check the number of errors that have occurred during each (Interval Time) seconds to see if they meet the error threshold. The error monitor inspects (Total Intervals) intervals before it stops.

**Note** Setting **Max Interval Errors** to 0 disables the error monitor and setting **Total Intervals** to 0 causes the error monitor to run continuously.

The following commands configure the error monitor:

- **Error Monitor Max Interval Errors:** Sets the number of errors allowed in an interval causes it to be considered an errored interval. If this is set to 0, then the error monitor is disabled.
- **Error Monitor Interval Time (sec):** Sets the length of each interval.
- **Error Monitor Interval Count:** Sets the number of errored intervals that causes the DSL link to restart.
- **Error Monitor Total Intervals:** Sets the number of intervals to inspect for errors before disabling the error monitor. If this is set to 0, then the error monitor will run continuously.
- **Error Monitor Start Up Delay:** Sets the number of seconds to wait after the DSL link comes up before the error monitor starts inspecting intervals.



## G.SHDSL Status

Selecting the *Status* hyperlink on the *Configuration Menu* provides the web page containing the G.SHDSL status and the Bridged PPP link status. The G.SHDSL Status is divided into three groups, *Run-Time Statistics*, *DSL Line Error Counters*, and *Local Interface Error Counters*.

### Run-Time Statistics

The *Run-Time Statistics* provide the state and relative health of the DSL link. The statistical parameters are described.

G.SHDSL Status			
Run-Time Statistics			
G.SHDSL State	<i>Normal Operation</i>	Connected	<i>TRUE</i>
Loss Of Signal	<i>Signal Found</i>	Loss Of Sync	<i>Sync Word Found</i>
DSL Sync State:	<i>In Sync</i>	Noise Margin: (dB)	20.5

Figure 10. DSL Run-time Statistics

- **G.SHDSL State:** The link may be in one of these states, *Deactivated*, *In Progress*, or *Normal Operation*.
- **Connected:** If there is a valid physical DSL link, the field is *TRUE*. If not, it displays *FALSE*.
- **Loss Of Signal:** Indicates *Signal Loss* or *Signal Found*.
- **Loss of Sync:** Indicates whether the Sync Word is synchronized.
- **DLS Sync State:** The sync state of the DSL link may be *Out of Sync*, *In Sync*, *Acquiring Sync*, or *Loss of Sync*.
- **Noise Margin (dB):** The maximum tolerable increase in external noise power that still allows for BER of less than  $1 \times 10^{-7}$ .

**Note** **G.SHDSL State vs. DSL Sync State**—The G.SHDSL State describes whether the DSL is training (in progress), linked (success), deactivated, or idle.

The DSL Sync State describes whether no sync words have been found (out of sync), whether there are no sync word errors (in sync), or whether we are transitioning from out of sync to in sync (acquiring sync) or vice versa (losing sync). Typically, when the link is training, the sync state goes from out of sync to acquiring sync to in sync.

### DSL Line Error Counters

Five counters display how many *Loss of Sync*'s have occurred, *CRC Errors*, *SEGD Errors*, *SEGA Errors*, and *Loss of Delineation*. Loss of Sync and CRC Errors are the most commonly used statistics in normal performance evaluation.

DSL Line Error Counters:			
Loss of Sync	14	CRC Errors	13
SEGD Errors	0	SEGA Errors	0
Loss of Delineation	0		

Figure 11. DSL line error counters

- **Loss of Sync:** The number of times that synchronization has been lost since the error counters have been cleared.
- **CRC Errors:** Shows the number of CRC errors that have occurred since either startup or the last time that error counters were cleared.
- **SEGD Errors:** The number of SEGD errors in the DSL link.
- **SEGA Errors:** The number of SEGA errors in the DSL link.
- **Loss of Delineation:** The number of time that delineation has been lost.

### Local Interface Error Counters

These counters are rarely used for normal performance evaluation or troubleshooting. However they are shown and listed here.

Local Interface Error Counters:	
RX Error Counter:	0
TX Error Counter:	168
DPLL Error Counter:	2

Figure 12. Local Interface Error Counters

### Clearing Error Counters

The error counters may be cleared in the Configuration web page or here in the Status web page. Select *Clear All Counters* and click on the **Submit** button.

DSL Line Error Counters:			
Loss of Sync	14	CRC Errors	13
SEGD Errors	0	SEGA Errors	0
Loss of Delineation	0		

Local Interface Error Counters:	
RX Error Counter:	0
TX Error Counter:	168
DPLL Error Counter:	2

Do not Clear	<input type="button" value="Submit"/>
--------------	---------------------------------------

Figure 13. Clearing the error counters

# Chapter 4 **Ethernet & WAN PPP config and status**

---

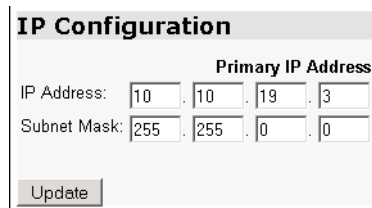
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## IP configuration

The most commonly used technique for changing the IP address and subnet mask is in the initial configuration via the console port. However you can also change the IP address in the web GUI pages. In the Configuration web pages is located the section for changing these two parameters. Enter the IP address and subnet mask to be used and click on the **Update** button.

After this change, you must change the IP address in your browser to login and view the web pages again. Be sure to save the changes into non-volatile memory. (See “[Saving the configuration](#)” on page 38.)



**IP Configuration**

Primary IP Address

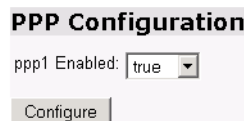
IP Address:  .  .  .

Subnet Mask:  .  .  .

Figure 14. Configuration of the IP address and subnet mask

## PPP configuration

Also found in the Configuration web pages is the parameter for enabling or disabling the Bridged PPP connection. Simply select *true* for enabling the PPP link and click on the **Configure** button.



**PPP Configuration**

ppp1 Enabled:

Figure 15. Enabling Bridged PPP over the DSL link

## Ethernet port configuration

The Ethernet port rarely needs to be reconfigured. However a wealth of Ethernet statistics are available when analyzing network performance.

### **Ethernet Basic Port Attributes**

Click on the Ethernet hyperlink to see the basic Ethernet statistical parameters. Important statistics include the link speed, full- or half-duplex operation, the MAC address, collisions and errors. This is primarily a diagnostic tool.

## Ethernet Port Configuration

[View advanced attributes...](#)

### Basic Port Attributes

Name	Value
MAC	00:a0:ba:01:48:01
Rx Ok	3063390
Rx Broadcast Packets	953380
Rx Error Packets	2154
Tx Ok	11914
Tx Collisions	373
Tx Error Packets	0
100Base	false
Connected	true
Full Duplex	false
Link Speed	100000

Figure 16. Ethernet performance statistics

### Ethernet Advanced Port Attributes

While in the page for the Ethernet Basic Port Attributes, click on *View advanced attributes...* to view many additional parameters which include three configurable variables—*Autonegotiation*, *100Base-TX operation*, and *Full-duplex*.

## Advanced Ethernet Port Configuration

[Return to basic attribute list...](#)

### Advanced Port Attributes

Name	Value
Rx No Buffer	0
Rx Error Align	0
Max Multicast Listsize	64
Max Queue	32

Figure 17. Top of web page for configurable Ethernet parameters

10Base Half Duplex	true
Auto Neg Ack Ok	false
Auto Neg Done	true
Auto Negotiation	<input type="text" value="true"/>
Auto Negotiate Restart	false
Connected	true
Dis Reconnect Count	6
Enable Duplex Check	true
Full Duplex	false
Jabber	false
Jabber Count	0
Link Speed	100000
100Base Mode	<input type="text" value="true"/>
Full Duplex Mode	<input type="text" value="false"/>
Remote100BTFD	false
Remote100BTHD	false
Remote10BTFD	false
Remote10BTHD	true
Remote Fault	false
Remote Fault Count	0

Figure 18. Configurable Ethernet parameters

## Chapter 5 **Installation & operation**

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Link (Yellow) .....	35
100M (Yellow) .....	35
Tx (Yellow) .....	35
Rx (Yellow) .....	35



## Installation

Once the Model 3088/I is properly configured, it is ready to connect to the twisted pair interface. This section tells you how to make the connection.

### Connecting the twisted-pair interface

The Model 3088/I supports communication between two DTE devices as follows over 2-wire single twisted-pair (TP).



The interconnecting cables shall be acceptable for external use and shall be rated for the proper application with respect to voltage, current, anticipated temperature, flammability, and mechanical serviceability.

Two things are essential:

1. These units work in pairs. Both units at the end of the twisted pair DSL span must be set for the same DTE rate—one unit set as CO, the other as CP.
2. To function properly, the Model 3088/I needs one twisted pair of metallic wire. This twisted pair must be unconditioned, dry, metallic wire, between 19 (0.9mm) and 26 AWG (0.4mm) (the higher number gauges will limit distance). Standard dial-up telephone circuits, or leased circuits that run through signal equalization equipment, or standard, flat modular telephone type cable, are *not* acceptable.

The RJ-11 connector on the Model 3088/I's twisted pair interface is polarity insensitive and is wired for a two-wire interface. The signal/pin relationships are shown in [Appendix D](#) on page 56.

## Operation

Once the Model 3088/I is properly configured and installed, it should operate transparently. This section describes information for powering the 3088/I, reading the LED status indicators, and using the built-in loop-back test modes.

### Power-up

(Also refer to “Power up the NTU” on page 17.)



**Ensure that the power cable used with the external power adapter meets all applicable standards for the country in which it is to be installed, and that it is connected to a wall outlet which has earth ground.**

The Model 3088/I uses a 5 VDC, 2A universal input 100–240 VAC, power supply (center pin is +5V). The universal input power supply has a male IEC-320 power entry connector. This power supply connects to the Model 3088/I by means of a barrel jack on the rear panel. Many international power cords are available for the universal power supply (Please refer to [Appendix C](#) on page 54 for country-specific power cords.

The 36-60 VDC DC to DC adapter is supplied with the DC version of the Model 3088/I. See “DC power-up” on page 17 for information about installing the DC power adapter.

The Model 3088/I powers up as soon as it is plugged into an AC outlet—there is no power switch.



**There are no user-serviceable parts in the power supply section of the Model 3088/I. Fuse replacement should only be performed by qualified service personnel. Contact Patton Electronics Technical support at (301)975-1007, via our web site at [www.patton.com](http://www.patton.com), or by e-mail at [support@patton.com](mailto:support@patton.com), for more information.**

## LED status indicators

There are eight LEDs that provide information on the state of the unit. Figure 19 shows the location of the front panel LEDs. Following [figure 19](#) is a description of each LED's function.

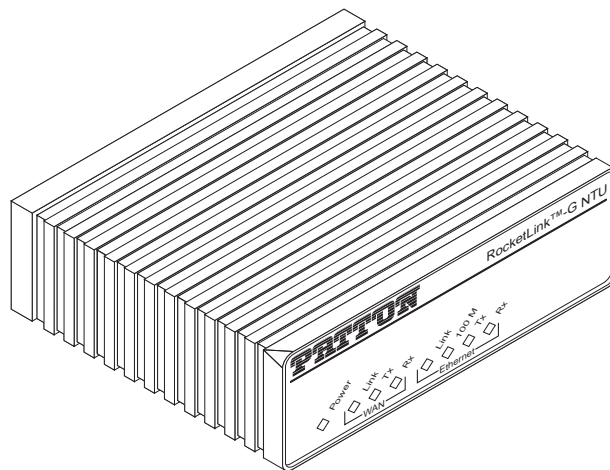


Figure 19. Model 3088/I front panel

### Power (Yellow)

The Power LED glows solid during normal operation. At startup, during the POST, the LED blinks once every second. If the POST fails, the unit does not enter normal operation, and the LED blinks once every 0.4 seconds.

### WAN LEDs

There are three WAN LEDs: *Link*, *Tx*, and *Rx*.

#### *Link (Yellow)*

The Link LED glows solid while a DSL link is established. While the DSL link is training the LED flashes.

#### *Tx (Yellow)*

The Link LED flashes as transmitted data is sent over the DSL link.

#### *Rx (Yellow)*

The Link LED flashes as data is received from the DSL link.

### **Ethernet LEDs**

There are four Ethernet LEDs: Link, 100M, Tx, and Rx.

#### *Link (Yellow)*

The Link LED glows solid when it receives a valid signal on the Ethernet port. If it is not flashing, change the position of the MDI-X switch on the rear panel. If the LED still fails to light, your cable may be faulty.

#### *100M (Yellow)*

The Link LED glows solid if the 100Mbps Ethernet link has been negotiated. If there is not Ethernet connection, the LED defaults to on to indicate that the Ethernet port is ready to operate in 100Base-TX mode.

#### *Tx (Yellow)*

The Link LED flashes upon transmitting data out the Ethernet port.

#### *Rx (Yellow)*

The Link LED flashes when receiving data from the Ethernet port.

## Chapter 6 **System Management**

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## RocketLink-G Plug 'n' Play

The RocketLink-G Plug 'n' Play feature allows ISPs, carriers and PTTs to quickly upgrade the link speed for a customer without requiring a visit to re-configure the Customer Premise (CP) Model 3088/I. This feature also allows service providers to set up all of the configurations at the Central Office (via the ForeFront AIS system) before installing the stand alone units at the customer site. This saves time doing on-site configuration.

**Note** RocketLink-G Plug 'n' Play is only available when using a ForeFront Model 3096RC as the CO unit.

The RocketLink-G Plug 'n' Play feature allows the user to configure the DTE rate of the CP unit (Remote) via the ForeFront Model 3096RC at the Central Office (Central). The stand alone unit at the Customer Premise (CP) site will automatically configure itself to the DTE rate (Bandwidth Allocation) defined at the Model 3096RC. Other configuration parameters remain in the default setting.

Follow the instructions below to activate RocketLink Plug 'n' Play between CO (Model 3096RC) and CP (Model 3088/I) units:

- Set the Model 3096RC (CO) to either Internal or External clocking mode as defined by the application.
- Verify that the Model 3088/I (CP) is configured for factory default settings.

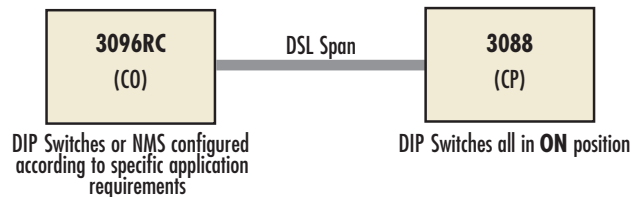


Figure 20. Typical RocketLink Plug 'n' Play Application

When the units connect over DSL, the 3088/I (CP) will enter a predefined default configuration. During the negotiation process between the units, the 3096RC (CO unit) will configure the DTE rate/line rate on the 3088/I as defined by the settings of the CO unit. When additional bandwidth is required, only the configuration of the CO unit should be changed. This feature gives ISPs, LECs and PTTs the ability to provision bandwidth on an as needed basis to customers.

## Saving the configuration

To save all configuration changes into non-volatile memory, click on the hyperlink *Save Configuration* in the *System Management* menu item. Click on the **Save** button and wait until you see the message that verifies the save was executed properly.

### Save configuration

#### Confirm Save

Please confirm that you wish to save the configuration.

*There will be a delay while saving as configuration information is written to flash.*

Save

Figure 21. Saving the configuration to non-volatile memory

## Reset for Factory Default

To recover from a forgotten password, the user may reset the unit to its factory configuration. Click on the *Reset* hyperlink in the *System Management* menu. If you want to reset to factory default settings, check the box for that function. (See [figure 22](#).) Click on the **Restart** button. Wait until the 3088/I has completely restarted before doing anything. At this point, you should return to the console port since the IP address also returns to its default setting. (See the next section.)

### Restart Router

From this page you may restart your router

#### Restart

After restarting, please wait for several seconds to let the system come up. If you would like to reset all configuration to factory default settings, please check the following box:

**Reset to factory default settings**

Restart

Figure 22. Resetting the 3088/I to factory default

## Console

The 3088/I offers a console command line interface. The terminal emulator should be configured to 9600 bps/ 1 stop bit/ no parity/ XON-XOFF flow control. This is typically used when doing the initial configuration of the IP address and subnet mask. (See also [“Configure the IP address”](#) on page 18.)

## Backing up and restoring saved configurations

At times you may want to store the completed configuration of your 3088/I on a PC so you can return to a working configuration easily. Click on the *Backup/Restore Configuration* hyperlink under the *System Management* menu.

Figure 23. Backing up and reloaded saved configurations

To back up the current *saved* configuration, click on *Backup configuration in your computer* hyperlink. You will have the option of either viewing the configuration file or saving it directly to your PC. (See [figure 23.](#))

To execute the reverse operation, click on the **Browse...** button, find and select the configuration file on your PC. Then click on the **Restore** button for reloading the previously saved configuration into the 3088/I.

## Authentication

In the *System Management* section of the *Configuration Menu*, click on the *Authentication* hyperlink. In this window, you may change the *superuser* password.

The other function is to create an additional user. In defining the new user, you can permit or prevent them from changing the configuration (view only) and also from dialing in to the unit for remote management. (See [figure 24.](#))

User	May Configure?	Authenticate Remote End?	Comment
superuser	true	true	Default Superuser <a href="#">Edit user...</a>

[Create a new user...](#)

Figure 24. Login Authorization

## System Software Upgrade

Over the course of time, new software is released. Also found on the *System Management* menu is the hyperlink *Software Upgrade*.

### Firmware Update

From this page you may update the system software on your network device

#### Select Update File

Updates (where available) may be obtained from [Patton Electronics Company](#)

New Firmware Image

[Options](#)

Figure 25. Upgrading software on the 3088/I

Click on the **Browse...** button to find and select the desired software version on your PC. Subsequently click on **Update** to invoke the upgrade process. It is *Essential* to wait until the upgrade is completed before attempting any access of the 3088/I.

Click on the *Options* hyperlink. This takes you to the *Firmware Update Configuration* page. Leave this set to *Enabled*. When enabled, the 3088/I will detect if you are trying to do a software upgrade with an incorrect or improper software image. (See [figure 26](#).)

### Firmware Update Configuration

#### Firmware Update Configuration

Firmware Update Protection:

Figure 26. Software upgrade protection



## Chapter 7 **Diagnostic tools**

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## LED status monitor & definition

See LED status indicators in “LED status indicators” on page 34.

## System tools for testing

Testing and troubleshooting can utilize a broad range of tools. Various types of tools are a part of the 3088/I capabilities, from observing the LED’s status, tracking the error counters, and using network tools which are described in this section.

### Ping & Traceroute

Ping and Traceroute are familiar to all IP network users. Go to the *Tools* hyperlink under *System Management* in the *Configuration Menu*. You will find both Ping and Traceroute tools available. Enter the IP address that you want to ping or traceroute. Click on the appropriate button to invoke the desired test.

**System Tools**  
This page gives the user access to system tools.

---

**Ping and Traceroute Controls**  
This allows the box to initiate a Ping or Traceroute request. Note that input must be an IP address in the form 'XXX.XXX.XXX.XXX'.

Figure 27. Ping and Traceroute

### Clearing error counters

The error counters may be cleared in the *Configuration* web page or here in the *Status* web page. Select *Clear All Counters* and click on the **Submit** button.

**DSL Line Error Counters:**

Loss of Sync	14	CRC Errors	13
SEGD Errors	0	SEGA Errors	0
Loss of Delineation	0		

---

**Local Interface Error Counters:**

RX Error Counter:	0
TX Error Counter:	168
DPLL Error Counter:	2

---

Figure 28. Clearing Error Counters

# Chapter 8 **Contacting Patton for assistance**

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## Introduction

---

This chapter contains the following information:

- “Contact information”—describes how to contact Patton technical support for assistance.
- “Warranty Service and Returned Merchandise Authorizations (RMAs)”—contains information about the warranty and obtaining a return merchandise authorization (RMA).

## Contact information

---

Patton Electronics offers a wide array of free technical services. If you have questions about any of our other products we recommend you begin your search for answers by using our technical knowledge base. Here, we have gathered together many of the more commonly asked questions and compiled them into a searchable database to help you quickly solve your problems.

### **Patton support headquarters in the USA**

- Online support: available at **www.patton.com**
- E-mail support: e-mail sent to **support@patton.com** will be answered within 1 business day
- Telephone support: standard telephone support is available five days a week—from **8:00 am to 5:00 pm EST (1300 to 2200 UTC/GMT)**—by calling **+1 (301) 975-1007**
- Fax: **+1 (253) 663-5693**

### **Alternate Patton support for Europe, Middle East, and Africa (EMEA)**

- Online support: available at **www.patton-inalp.com**
- E-mail support: e-mail sent to **support@patton-inalp.com** will be answered within 1 business day
- Telephone support: standard telephone support is available five days a week—from **8:00 am to 5:00 pm CET (0900 to 1800 UTC/GMT)**—by calling **+41 (0)31 985 25 55**
- Fax: **+41 (0)31 985 25 26**

## Warranty Service and Returned Merchandise Authorizations (RMAs)

---

Patton Electronics is an ISO-9001 certified manufacturer and our products are carefully tested before shipment. All of our products are backed by a comprehensive warranty program.

**Note** If you purchased your equipment from a Patton Electronics reseller, ask your reseller how you should proceed with warranty service. It is often more convenient for you to work with your local reseller to obtain a replacement. Patton services our products no matter how you acquired them.

### **Warranty coverage**

Our products are under warranty to be free from defects, and we will, at our option, repair or replace the product should it fail within one year from the first date of shipment. Our warranty is limited to defects in workmanship or materials, and does not cover customer damage, lightning or power surge damage, abuse, or unauthorized modification.

### *Out-of-warranty service*

Patton services what we sell, no matter how you acquired it, including malfunctioning products that are no longer under warranty. Our products have a flat fee for repairs. Units damaged by lightning or other catastrophes may require replacement.

### *Returns for credit*

Customer satisfaction is important to us, therefore any product may be returned with authorization within 30 days from the shipment date for a full credit of the purchase price. If you have ordered the wrong equipment or you are dissatisfied in any way, please contact us to request an RMA number to accept your return. Patton is not responsible for equipment returned without a Return Authorization.

### *Return for credit policy*

- Less than 30 days: No Charge. Your credit will be issued upon receipt and inspection of the equipment.
- 30 to 60 days: We will add a 20% restocking charge (crediting your account with 80% of the purchase price).
- Over 60 days: Products will be accepted for repairs only.

### **RMA numbers**

RMA numbers are required for all product returns. You can obtain an RMA by doing one of the following:

- Completing a request on the RMA Request page in the *Support* section at **www.patton.com**
- By calling **+1 (301) 975-1007** and speaking to a Technical Support Engineer
- By sending an e-mail to **returns@patton.com**

All returned units must have the RMA number clearly visible on the outside of the shipping container. Please use the original packing material that the device came in or pack the unit securely to avoid damage during shipping.

### *Shipping instructions*

The RMA number should be clearly visible on the address label. Our shipping address is as follows:

#### **Patton Electronics Company**

RMA#: xxxx

7622 Rickenbacker Dr.

Gaithersburg, MD 20879-4773 USA

Patton will ship the equipment back to you in the same manner you ship it to us. Patton will pay the return shipping costs.

# Appendix A **Compliance information**

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## Compliance

---

### EMC

- FCC Part 15, Class A
- EN55022, Class A
- EN55024

### Safety

- UL 60950-1/CSA C22.2 N0. 60950-1
- IEC/EN60950-1
- AS/NZS 60950-1

### PSTN Regulatory

- FCC Part 68
- CS-03
- AS/ACIF S043:2003

## FCC Part 68 (ACTA) Statement

---

This equipment complies with Part 68 of FCC rules and the requirements adopted by ACTA. On the bottom side of this equipment is a label that contains—among other information—a product identifier in the format *US: AAAEQ##TXXXX*. If requested, this number must be provided to the telephone company.

The method used to connect this equipment to the premises wiring and telephone network must comply with the applicable FCC Part 68 rules and requirements adopted by the ACTA.

If this equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

If trouble is experienced with this equipment, for repair or warranty information, please contact our company. If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.

## Radio and TV Interference (FCC Part 15)

---

This equipment generates and uses radio frequency energy, and if not installed and used properly—that is, in strict accordance with the manufacturer's instructions—may cause interference to radio and television reception. This equipment has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reason-

able protection from such interference in a commercial installation. However, there is no guarantee that interference will not occur in a particular installation. If the equipment causes interference to radio or television reception, which can be determined by disconnecting the cables, try to correct the interference by one or more of the following measures: moving the computing equipment away from the receiver, re-orienting the receiving antenna, and/or plugging the receiving equipment into a different AC outlet (such that the computing equipment and receiver are on different branches).

## Industry Canada Notice

---

This equipment meets the applicable Industry Canada Terminal Equipment Technical Specifications. This is confirmed by the registration number. The abbreviation, IC, before the registration number signifies that registration was performed based on a Declaration of Conformity indicating that Industry Canada technical specifications were met. It does not imply that Industry Canada approved the equipment.

This Declaration of Conformity means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction. Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above condition may not prevent degradation of service in some situations. Repairs to some certified equipment should be made by an authorized maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment. Users should ensure for their own protection that the ground connections of the power utility, telephone lines and internal metallic water pipe system, are connected together. This protection may be particularly important in rural areas.

## CE Declaration of Conformity

---

We certify that the apparatus identified in this document conforms to the requirements of Council Directive 1999/5/EC on the approximation of the laws of the member states relating to Radio and Telecommunication Terminal Equipment and the mutual recognition of their conformity.

The safety advice in the documentation accompanying this product shall be obeyed. The conformity to the above directive is indicated by the CE sign on the device.

## Authorized European Representative

---

D R M Green

European Compliance Services Limited.

Oakdene House, Oak Road

Watchfield,

Swindon, Wilts SN6 8TD, UK



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## General characteristics

---

- Compact low-cost Plug 'n' Play NTU
- 10/100 Ethernet port
- Unlimited host support
- Comprehensive hardware diagnostics, independent of operating system, easy maintenance and effortless installation
- Plug 'n' Play operation for fast and seamless turn-up with pre-configured WAN and LAN options
- Built-in web configuration
- Simple software upgrade using FTP into FLASH memory
- Eight front panel LEDs indicate Power, DSL WAN, Ethernet LAN speed and status
- Convenient and standard RJ connectors for Ethernet, Line, and Console
- External UI
- Field factory default option
- Standard 1 year warranty

## G.SHDSL characteristics

---

- 4.6 Mbps maximum speed over 2-wire
- Data rates from 192 kbps to 4.608 Mbps
- Annex A (ANSI), Annex B (ETSI) PSD selection
- 2-wire support ITU G.991.2 and ETSI TS 101524 with G.994.1 handshake
- When connecting two NTUs in a point-to-point application, one NTU must be set for central mode, the other for remote mode
- EOC management channel for remote end-to-end management

## Ethernet

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- Auto-sensing Full-duplex 10Base-T/100Base-TX Ethernet
- Standard RJ-45 and built-in MDI-X cross-over switch
- IEEE 802.1d transparent learning bridge up to 1024 addresses and Spanning Tree Protocol

## Protocol support

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- Complete internetworking with IP (RFC 741), TCP (RFC 793), UDP (RFC 768), ICMP (RFC 950), ARP (RFC 826)
- Built-in Ping and Traceroute facilities
- Point-to-Point Protocol over HDLC

## Management

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- Web-based configuration via embedded web server
- CLI menu for configuration, management, and diagnostics
- Local (VT-100 or Telnet)
- Console port set at 9600 bps, 8 bits, no parity, 1 stop bit, no flow control

## 10Base-T/100Base-TX interface

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The Ethernet port is a shielded RJ-45 jack, autonegotiate, full- or half-duplex with an MDI-X switch. See Appendix E, “[RJ-45 shielded 10/100 Ethernet port](#)” on page 58 for the pinout.

## Serial connector

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The console port is an RS-232 interface (EIA-561) on an RJ-45 jack. See Appendix F, “[RS-232 console interface pin assignments](#)” on page 60 for the pinout.

## Diagnostics

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Various diagnostic features are integrated into the 3088/I NTU. Ping and Traceroute facilities. DSL run-time statistics, DSL line error counters, Local interface error counters, Bridged PPP statistics, Ethernet port statistics, and front panel status LEDs (see section “[Status LEDs](#)”).

## Status LEDs

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### Power

The Power LED glows solid during normal operation. At startup, during the POST, the LED blinks once every second. If the POST fails, the unit does not enter normal operation, and the LED blinks once every 0.4 seconds.

### WAN Link

The DSL LED glows solid while a DSL link is established. While the DSL link is training it blinks once every second.

### WAN Tx

The DSL LED glows solid while a DSL link is established. While the DSL link is training it blinks once every second.

### WAN Rx

The DSL LED glows solid while a DSL link is established. While the DSL link is training it blinks once every second.

### Ethernet Link

The DSL LED glows solid while a DSL link is established. While the DSL link is training it blinks once every second.

### Ethernet 100M

The DSL LED glows solid while a DSL link is established. While the DSL link is training it blinks once every second.

### Ethernet Tx

The DSL LED glows solid while a DSL link is established. While the DSL link is training it blinks once every second.

### Ethernet Rx

The DSL LED glows solid while a DSL link is established. While the DSL link is training it blinks once every second.

## Power



**Ensure that the power cable used with the external power adapter meets all applicable standards for the country in which it is to be installed, and that it is connected to a wall outlet which has earth ground.**

The Model 3088/I power input is 5 VDC from an external desk top power supply, universal input 100–240 VAC, 50–60 Hz, 0.3 A. The universal input power supply has a male IEC-320 power entry connector. This power supply connects to the Model 3088/I by means of a barrel jack (center pin is +5V) on the rear panel. Many international power cords are available for the universal power supply (Please refer to [Appendix C](#) on page 54 for country-specific power cords.

The Model 3088/I powers up as soon as it is plugged into an AC outlet—there is no power switch.

### 48 VDC power supply



The external DC adaptor shall be a listed limited power source that incorporates a disconnect device and shall be positioned within easy reach of the operator. The interconnecting cables shall be rated for the proper voltage, current, anticipated temperature, flammability, and mechanical serviceability

- Input
  - Rated voltage: 36–60 VDC
  - Rated current: 0.25 A DC
- Output
  - Rated voltage: 5 VDC  $\pm$  5%, 5W
  - Rated current: 1 A DC
  - 6-inch cable terminated with 2.5 mm barrel plug, center positive
- Isolation: 500 VDC

### **G.SHDSL Physical connection & Transmission Line**

RJ-11, Two-wire (single twisted pair), polarity insensitive, pins 3 & 4. (See [Appendix D](#) on page 56.)

#### **Line Coding**

TC-PAM 16 (Trellis Coded Pulse Amplitude Modulation) for rates from 192 kbps to 2.304 Mbps. TC-PAM 32 for rates above 2.304 Mbps.

#### **Line Interface**

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Transformer coupled, 2500 VRMS isolation

#### **Environment**

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**Operating temp:** 32–122°F (0–50°C)

**Humidity:** 5–95% non-condensing

**Altitude:** 0–15,000 feet (0–4,600 meters)

#### **Dimensions**

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4.2W x 1.6H x 5.55L inches (10.7W x 4.1H x 14.1L cm)

## Appendix C **Factory replacement parts and accessories**

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## Factory replacement parts and accessories

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Model #	Description
08055DCUI	100–240VAC (+5V $\pm$ 5% reg. DC/2A) Universal Input Adapter
0805EUR	European Power Cord CEE 7 ("A")
0805UK	United Kingdom Power Cord ("D")
0805US	American Power Cord ("K")
0805AUS	Australia/New Zealand Power Cord ("C")
0805DEN	Denmark Power Cord ("E")
0805FR	France/Belgium Power Cord ("F")
0805IN	India Power Cord ("G")
0805IS	Israel Power Cord ("H")
0805JAP	Japan Power Cord ("J")
0805SW	Switzerland Power Cord ("L")
07M3088/I-GS	Model 3088/I Getting Started Guide
07M3088/I-QS	Model 3088/I Quick Start Guide
07MFOREFRONT-CD	ForeFront AIS CD-ROM

## Appendix D **RJ-11 non-shielded DSL port**

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## RJ-11 non-shielded DSL port

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Single twisted-pair (TP) for full-duplex transmission. The signals are polarity insensitive.

Pin #	Signal
1	
2	Tip
3	Ring
4	

# Appendix E **RJ-45 shielded 10/100 Ethernet port**

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## RJ-45 shielded 10/100 Ethernet port

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**Note** The following table assumes the MDI-X switch is in the out position.

Pin #	Signal
1	TX+ (output)
2	TX- (output)
3	RX+ (input)
4	
5	
6	RX- (input)
7	
8	

# Appendix F **RS-232 console interface pin assignments**

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## RS-232 console interface pin assignments

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RJ-45 non-shielded Connector (EIA-561)

Pin	Signal
1	DSR (out)
2	CD (out)
3	DTR (in)
4	Signal Ground
5	RD (out)
6	TD (in)
7	CTS (out)
8	RTS (in)